

# PATENT ABSTRACTS OF JAPAN

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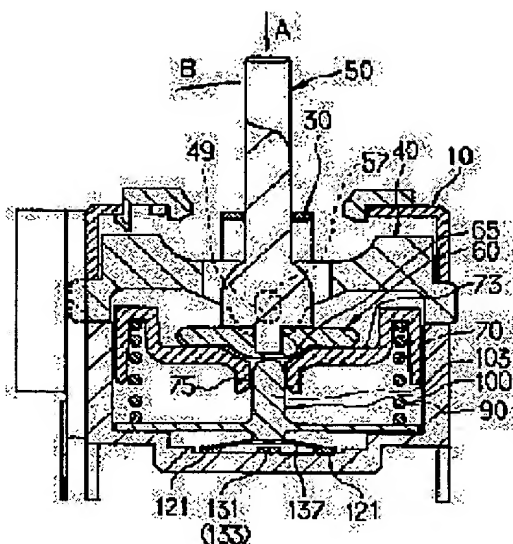
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(54) **MULTI-DIRECTIONALLY SWINGING ELECTRONIC COMPONENT**



(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a multi-directionally swinging electronic component which can be constructed in a small size and which permits operation of a push-button switch by pressing a lever in the direction of the swinging axis even though the lever is in the swinging condition.

**SOLUTION:** A multi-directionally swinging electronic component is composed of two arms 30 and 40 borne rotatably in orthogonal intersection in a case 10, a swinging

member 50 swingable in penetrating the arms 30 and 40 and slidable in the direction of the swinging axis, a swing plate 60 attached to the swinging member 50, a guide member 70 installed under the swing plate 60, a repelling means 90 to repel the guide member 70 upward, a pressing member 100 whose top penetrates the guide member 70 to take position contacting with or close to the swing plate 60, and a switch contact mechanism (121, 131, 137) which is turned on and off by the vertical motions of the pressing member 100. A protrusive surface 65 is formed on the swing plate 60, and it is arranged so that the protrusive surface 65 is positioned always contacting with or close to the pressing member 100 even when the swing plate 60 is swinging.

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[Claim(s)]

[Claim 1] The rocking member which is inserted in two arms which intersect perpendicularly and are supported to revolve rotatable, and said two arms, respectively, and is attached can rock freely and free [ the slide to rocking shaft orientations ], In the lower part of said rocking member at this rocking member and one Or the rocking plate attached as another member, The guide member arranged in the rocking plate bottom, and a means from a cartridge to hold this rocking plate in a center valve position by carrying out the from cartridge of the guide member to above, and making the top face of this guide member \*\*\*\* on the inferior surface of tongue of said rocking plate, The press member which serves as a location where the upper limit penetrated this guide member, and contacted or approached said rocking plate while being arranged at said guide member

bottom, The multi-direction rocking mold electronic parts characterized by providing the switch contact mechanism which is installed in this press member bottom and turned on and off by vertical movement of this press member, and the rotating type electronic parts attached in said arm.

[Claim 2] The multi-direction rocking mold electronic parts according to claim 1 characterized by forming the protrusion side which has a curved surface in the part which the upper limit of said press member of said rocking plate contacts or approaches.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the multi-direction rocking mold electronic parts which can operate a push button switch by being able to operate rotating type electronic parts and pressing this rocking member to rocking shaft orientations by rocking the rocking member which consists of a lever, a pad, etc. in front and rear, right and left or the other direction.

[0002]

[Description of the Prior Art] Conventionally this kind of multi-direction rocking mold electronic parts like a publication to JP,6-26133,U The lever which projects from the top face of a case into the part a part and both the crank member cross at right angles while two crank members are contained so that it may intersect perpendicularly in a case, and attaching rotating type electronic parts in the edge of both the crank member is attached. The push button switch has been arranged under the edge of a predetermined die-length projection and the this projecting crank member to the way outside a case, and the edge of one crank member was constituted.

[0003] And if a lever is rocked in front and rear, right and left or the other direction, the output of the rotating type electronic parts attached in both the crank member will change.

[0004] By on the other hand stuffing a lever into rocking shaft orientations, one crank member is made to rock focusing on the end, the other end is dropped, and the push button switch arranged in the bottom of the other end is turned on.

[0005]

[Problem(s) to be Solved by the Invention] However, since a push button switch must be attached out of a case in the above-mentioned conventional example, the miniaturization cannot be attained.

[0006] Moreover, although the thing of the structure which contained the push button switch was also in the case conventionally, since this push button switch

was installed in the center of the pars basilaris ossis occipitalis of a case, only when a lever is made into the upright location (center valve position), it is the thing of the structure which can press this in the lower limit section of a lever, and there was a trouble that this could not be pressed, in the condition [ that the lever has rocked ].

[0007] By making this invention in view of an above-mentioned point, even if it is in a condition [ that the lever has rocked even if ], the purpose is to offer the multi-direction rocking mold electronic parts which can operate a push button switch by pressing this to rocking shaft orientations, while being able to attain a miniaturization.

[0008]

[Means for Solving the Problem] Two arms which this invention intersects perpendicularly and are supported to revolve rotatable in order to solve the above-mentioned trouble, The rocking member which is inserted in said two arms, respectively and is attached can rock freely and free [ the slide to rocking shaft orientations ], In the lower part of said rocking member at this rocking member and one Or the rocking plate attached as another member, The guide member arranged in the rocking plate bottom, and a means from a cartridge to hold this rocking plate in a center valve position by carrying out the from cartridge of the guide member to above, and making the top face of this guide member \*\*\*\* on the inferior surface of tongue of said rocking plate, The press member which serves as a location where the upper limit penetrated this guide member, and contacted or approached said rocking plate while being arranged at said guide member bottom, The switch contact mechanism which is installed in this press member bottom and turned on and off by vertical movement of this press member, and the rotating type electronic parts attached in said arm were provided, and the multi-direction rocking mold electronic parts were constituted.

[0009]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is

explained to a detail based on a drawing. Drawing 1 and drawing 2 are the decomposition perspective views of the multi-direction rocking mold electronic parts concerning 1 operation gestalt of this invention, and show the one multi-direction rocking mold electronic parts in both drawings.

[0010] As shown in both drawings, these multi-direction rocking mold electronic parts In the upper case 10, two arms 30 and 40, rocking members 50, and rocking plates 60, The guide member 70, the member 90 from a cartridge, the press member 100, and the switch contact mechanism 120, The bottom case 140 is contained, on the other hand, the rotating type variable resistor 180,190 is attached in periphery 2 side face of the upper case 10, respectively, covering 200 is further attached on the upper case 10, and it is constituted. Each component part is explained below.

[0011] The upper case 10 is formed by bending a metal plate to the core box by which the inferior surface of tongue was opened wide. And the circular hole 11 is formed in the top face, and the stop holes 13 and 13 are formed in the both sides.

[0012] Moreover, the circular holes 23 and 23 are formed in the side faces 15 and 19 of a pair in which the upper case 10 counters, respectively, and the notch slots 25 and 25 are established in the side faces 17 and 21 of a pair in which another side counters.

[0013] Moreover, the bending section 27 is formed the lower limit side of a side face 15, and four stop pawls 29 (however, the thing by the side of a side face 19 is not shown) are formed in side faces 17 and 19, respectively.

[0014] A long hole 35 is formed in the center, and an arm 30 is constituted while it incurvates a metal plate in the shape of an abbreviation arch and forms the stop projections 31 and 33 in the both ends.

[0015] As shown in drawing 1 and drawing 3 , it is an abbreviation straight-line-like metal rod, an arm 40 forms the stop projections 41 and 43 in the both ends, and forms a long hole 45 in the center, forms the support tongue-shaped pieces 47 and 47 which project on both sides of the long hole 45

of the lower part further at an approximate circle arc, forms every one stop holes 49 and 49 in both the support tongue-shaped pieces 47 and 47, respectively, and is constituted. The stop holes 49 and 49 are formed in the ellipse configuration all prolonged in a lengthwise direction.

[0016] The rocking member 50 is cylindrical as shown in drawing 1 , it forms the broad section 51 in the lower part, and forms a through tube 53 in the broad section 51, and goes caudad from the broad section 51, projects the stop projection 55 and is constituted.

[0017] The rocking plate 60 fabricates synthetic-resin material to approximate circle tabular, as shown in drawing 1 and drawing 4 , it establishes a crevice 63 in the top face around this stop hole 61, establishes further the protrusion side 65 which projects in the shape of the spherical surface in the center of an inferior surface of tongue, and is constituted while it forms the stop hole 61 which is not penetrated in the center of a top face. In addition, even if the rocking plate 60 rocks this protrusion side 65, it is formed with the curvature from which this protrusion side 65 serves as a location which contacted or approached the upper limit of the press section 103 of the press member 100 which carries out the following. The sake of the recess which prevents that the support tongue-shaped pieces 47 and 47 of said arm 40 contact the rocking plate 60 formed the crevice 63.

[0018] The guide member 70 fabricates synthetic-resin material to approximate circle tabular, as shown in drawing 2 and drawing 5 . In the crevice 71 prepared in the center of a top face, the contact side 73 which carries out field contact of the inferior surface of tongue of said rocking plate 60 is established. Moreover, the through tube 75 which inserts in the press section 103 of the press member 100 which carries out the following in the center of the applicable plane of composition 73 is formed. On the other hand, the guide rail 77 guided to the guide slot 145 of the bottom case 140 which is prolonged in the vertical direction and carries out the following free [ vertical movement ] is formed in the periphery, the spring



receipt crevice 79 is further established in the inferior surface of tongue in the shape of a ring, and it is constituted.

[0019] The member 90 from a cartridge is constituted by the coil spring as shown in drawing 2 .

[0020] By fabricating synthetic-resin material, as shown in drawing 2 and drawing 6 , the press member 100 possesses the ring-like fixed part 101 and the press section 103 of the shape of an approximate circle column attached in the center of a fixed part 101 through 4 sets of hinge regions 102, and is constituted. The upper limit side 105 of the press section 103 is formed so that it may project in the shape of a semi-sphere side.

[0021] The switch contact mechanism 120 is constituted by two metal terminals 121,131 and movable contact pieces 137 as shown in drawing 2 . The metal terminal 121 consists of a stationary contact 123 of omega configuration, and two terminals 125,127 pulled out from the both ends, and the metal terminal 131 consists of a circular stationary contact 133 and one terminal 135 pulled out from the end, and the movable contact piece 137 forms an elastic metal plate in the shape of a dome, and is constituted.

[0022] The bottom case 140 is a product made of synthetic resin, the appearance is formed in the dimension configuration which can be contained inside said upper case 10, and the receipt crevice 141 which contains said various electronic parts is formed in the center, and the guide projection 143 is formed in the four corners, respectively, and the guide slot 145 which extends in a lengthwise direction is formed inside each guide projection 143.

[0023] As for the bottom case 140, while counters, and the notch slot 25 of said upper case 10 and the protruding line 147,147 inserted into 25 are formed in the lateral surface, respectively.

[0024] Moreover, the terminal derivation section 149 which derives said terminal 125,127,135 outside is formed in one lateral surface of the bottom case 140, and this terminal derivation section 149 possesses the terminal through tube 153.

[0025] In addition, 170 shown in drawing 2 is an insulating pressure plate, and the insertion hole 171,171 which inserts the projection 155,155 of two which the dimension is formed in wrap magnitude in said terminal derivation section 149 top, and prepared in said terminal derivation section 149 in the interior is formed.

[0026] Moreover, both tie-down plate 181,191 is connected by the hinge 189, and, as for the rotating type variable resistor 180,190 shown in drawing 1 , opening 183,193 is formed in both the tie-down plates 181,191, respectively.

[0027] Covering 200 consisted of abbreviation plate-like synthetic-resin plates, and formed the circular opening 201 in the center, and has formed the stop pawl 203,203 in the two angles which counter.

[0028] Next, in order to assemble these multi-direction rocking mold electronic parts, the rocking member 50 is attached in an arm 40 by inserting a pin 57 in the stop holes 49 and 49 of an arm 40, and the through tube 53 of the rocking member 50, where the rocking member 50 is first inserted into the long hole 45 of an arm 40.

[0029] At this time, the pin 57 is being loosely engaged to the stop holes 49 and 49, and to a through tube 53, was attached and has fitted in. That is, the rocking member 50 is attached free [ rocking ] centering on the pin 57 to the arm 40, and since the stop holes 49 and 49 are ellipse configurations in the vertical direction, the rocking member 50 can move up and down somewhat.

[0030] And the stop projection 55 of this rocking member 50 is fitted in and fixed to the stop hole 61 of the rocking plate 60.

[0031] On the other hand, although the metal terminal 121,131 is contained in the receipt crevice 141 of the bottom case 140, a stationary contact 123,133 is laid in the base of the receipt crevice 141 in that case, and a terminal 125,127,135 is inserted into the terminal through tube 153, and it is made to project caudad. And the movable contact piece 137 is attached with adhesive tape etc. on the stationary contact 123.

[0032] Next, although the press member 100, the member 90 from a cartridge,

and the guide member 70 are contained in the bottom case 140, the guide rail 77 of the guide member 70 is inserted in the guide slot 145 of the bottom case 140 in that case. Moreover, the insulating pressure plate 170 is laid on the terminal derivation section 149. The insulating pressure plate 170 is laid for the bending section 27 of the metal upper case 10 contacting a terminal 125,127,135 directly, and making it not short-circuit.

[0033] On the other hand, covering 200 is laid in the top face of the upper case 10, and the stop pawl 203,203 is stopped to the stop holes 13 and 13 of the upper case 10, and it fixes.

[0034] Next, an arm 30 is inserted from under the upper case 10, and the stop projections 31 and 33 are stopped to the circular holes 23 and 23.

[0035] Next, the stop projections 41 and 43 of an arm 40 are inserted in the notch slots 25 and 25 of the upper case 10. The upper part of the rocking member 50 attached in the arm 40 at that time is inserted in the long hole 35 of an arm 30, and the opening 201 of the covering 200 further attached in the upper case 10 is made to penetrate.

[0036] Next, on the bottom case 140 which contained said various components, it attaches so that the upper case 10 which contained various components may be put, and both are unified by bending the pawl 28 formed the lower limit side of the upper case 10 on the inferior surface of tongue of the bottom case 140.

[0037] And it contacts, respectively by bending the tie-down plate 181,191 of two rotating type variable resistors 180,190 on two side faces 17 and 19 of the upper case 10, and bending a hinge 189 at a right angle, and the stop pawl 29 is stopped, and the tip is bent to the stop crevice 185,195 established in both the tie-down plates 181,191, and it fixes to it. It engages with the body of revolution which the stop projections 33 and 41 prepared in the opening 183,193 prepared in the rotating type variable resistor 180,190 at the end of both the arms 30 and 40 are inserted, and the rotating type variable-resistor 180,190 interior does not illustrate at this time.

[0038] Drawing 7 is the outline sectional side elevation showing the internal structure of the multi-direction rocking mold electronic parts assembled as mentioned above. As shown in this drawing, the inferior surface of tongue of the press section 103 of the press member 100 is in contact with the movable contact piece 137. The upper limit of this press section 103 has penetrated the through tube 75 of the guide member 70. The guide member 70 is energized upward by the means 90 from a cartridge, and the rocking member 50 is held in the upright position because the inferior surface of tongue of the rocking plate 60 \*\*\*\* and carries out field contact in the contact side 73 of the guide member 70. Moreover, the upper limit of the press section 103 touches lightly the protrusion side 65 of rocking plate 60 inferior surface of tongue, and two arms 30 and 40 intersect perpendicularly and are supported to revolve free [ rotation in a case 10 ] also for any.

[0039] And if the rocking member 50 is pressed to shaft orientations (the direction of arrow-head A) in this condition The rocking member 50 whole descends to shaft orientations because the pin 57 fixed to the rocking member 50 descends the inside of the stop hole 49 of an arm 40, and 49. By this, the press section 103 is pressed, the lower limit presses the movable contact piece 137, and the movable contact piece 137 contacts the central stationary contact 133, and turns on between both the metal terminals 121,131. If the press to the shaft orientations to the rocking member 50 is canceled, by the resiliency of the movable contact piece 137 and the member 90 from a cartridge, the auto return of the rocking member 50 will be changed into the condition which shows in drawing 7 , and it will serve as OFF between both the metal terminals 121,131.

[0040] Moreover, if it rocks in the direction of arrow-head B which shows the rocking member 50 to drawing 7 , for example, the rotating type variable resistor 180 (refer to drawing 1 ) connected with this arm 30 because an arm 30 rocks as while shows drawing 8 will drive.

[0041] Thus, even if the rocking member 50 rocks, the protrusion side 65 of the

rocking plate 60 is projected in the shape of the spherical surface as mentioned above, and since it is formed so that this protrusion side 65 may contact or approach the upper limit of the press section 103 even if the rocking plate 60 rocks the curvature as mentioned above, this protrusion side 65 is located in the location which contacted or approached the upper limit of the press section 103.

[0042] Therefore, if the rocking member 50 is pressed to shaft orientations (the direction of arrow-head C) with the condition which shows in drawing 8 , the rocking member 50 whole descends to shaft orientations too, by this, as shown in drawing 9 , the lower limit of the press section 103 presses the movable contact piece 137, and between both the metal terminals 121,131 turns on. If the press to the shaft orientations to the rocking member 50 is canceled, the auto return of the rocking member 50 will be changed into the condition which shows in drawing 8 , and it will serve as OFF between both the metal terminals 121,131. If the rocking force to the rocking direction (arrow head B) to the rocking member 50 is furthermore canceled, the auto return of the rocking plate 60 and the rocking member 50 will be carried out by the resiliency of the means 90 from a cartridge to the center valve position shown in drawing 7 .

[0043] When it rocks to a space near-side [ which shows the rocking member 50 to drawing 7 ], or back side, it operates similarly.

[0044] Moreover, when the rocking member 50 is made to rock in the direction of [ except said ], according to this rocking direction and a rocking include angle, both the arms 30 and 40 rock, respectively and both the rotating type variable resistor 180,190 operates. Even in such a case, if the rocking member 50 is pressed in the condition of having rocked, it cannot be overemphasized that the movable contact piece 137 can be pressed as it is.

[0045] In addition, said rocking plate 60 may be formed in one instead of the rocking member 50 and another components.

[0046] Moreover, said protrusion side 65 may not necessarily be the spherical surface-like, and as long as it is a curved surface used as the location where it

projected in even if the rocking plate 60 rocked in short, and the field 65 contacted or approached the upper limit of the press member 100, they may be other configurations.

[0047]

[Effect of the Invention] Since the protrusion side which can contain a push button switch easily in a case, and has the curved surface of predetermined curvature to about [ that the miniaturization can be attained ]' and a rocking plate was established according to this invention as explained to the detail above, even if it is in the condition which rocked the lever even if, it has the outstanding effectiveness that a push button switch can be operated by pressing this to shaft orientations.

[Brief Description of the Drawings]

[Drawing 1] It is the decomposition perspective view of the multi-direction rocking mold electronic parts concerning 1 operation gestalt of this invention.

[Drawing 2] It is the decomposition perspective view of the multi-direction rocking mold electronic parts concerning 1 operation gestalt of this invention.

[Drawing 3] It is drawing showing an arm 40, and this drawing (a) is a side elevation and this drawing (b) is a rear-face Fig.

[Drawing 4] It is the sectional side elevation of the rocking plate 60.

[Drawing 5] It is the sectional side elevation of the guide member 70.

[Drawing 6] It is the sectional side elevation of the press member 100.

[Drawing 7] It is the outline sectional side elevation showing the internal structure of the multi-direction rocking mold electronic parts.

[Drawing 8] It is the explanatory view of the multi-direction rocking mold electronic parts of operation.

[Drawing 9] It is the explanatory view of the multi-direction rocking mold electronic parts of operation.

[Description of Notations]

10 Upper Case

30 40 Arm

35 45 Long hole

50 Rocking Member

60 Rocking Plate

65 Protrusion Side

70 Guide Member

90 Means from Cartridge

100 Press Member

120 Switch Contact Mechanism

140 Bottom Case

180,190 Rotating type electronic parts